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Feedback and Growth Mindset: Nurturing a Growth Mindset Through Feedback with Middle School Students

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Abstract
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Nurturing a Growth Mindset Through Feedback with Middle School Students

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Action Research Report
Submitted in Partial Fulfillment
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Degree of Master of Education

Department of Education
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Abstract

The purpose of this research study was to explore how a teacher can nurture a growth mindset in students using feedback and assessment, inviting them to take initiative and responsibility in their learning process. The research questions sought to answer how a teacher's beliefs about the malleability of intelligence and ability impacts students' beliefs and mindset as well as to explore the practices used by teachers in giving feedback to students that nurture a growth mindset. Five teachers, along with their classes of middle school students, were surveyed to assess mindset towards learning. To dig deeper into the questions of mindset, interviews with eleven students from one class and focus group discussions with the three other classes were also conducted. While no statistically significant correlation could be drawn between teacher and student mindset in the quantitative data, qualitative results highlighted the importance of the choices that teachers make in fostering a growth mindset in their students.

How often has a teacher observed a student carelessly toss a returned test or written assignment with nothing but a cursory glance at a mark scrawled on top? How do educators that take the craft of teaching seriously and responsibly, ensure that their feedback has been received and has spurred on further learning? Assessment is a key part of the relationship between student and teacher and frames much of their interaction. Much of the school day is spent both formally and informally assessing student learning, all the while communicating progress and feedback. A significant portion of teacher time is spent engaging in various forms of assessment to give quality feedback and to inform next steps in learning. Randal and Zundel (2012) define assessment as the process by which a performance is judged as it is against a standard and feedback is provided on how to close any gap between the two (p. 1). The feedback given after the assessment is the most useful information, having the potential to spur students forward. Depending on how a teacher communicates progress to a student, a student may feel encouraged and empowered to move on or may feel uncertain and discouraged.

When considering assessment, it is important to consider which methods of assessment nurture a mindset towards growth and are more likely to compel students to try again after failure and to seek opportunities to grow. When assessing student work, teachers might be giving formative feedback via rubrics, conversations, taking a survey, observing or any other creative ideas the teacher may have. Formative feedback is intended to point towards improvement and invite response. There may be summative evaluations in various forms of projects, tests, or other presentations of learning. Typically, summative assessment is a final, closed evaluation that does not invite a response from the learner. To balance teacher feedback and assessment, there may also be student self-assessment and peer assessment. This may be a student carefully examining their work using an exemplar, list of criteria or detailed rubric. It may be a gallery

walk of peers giving each other encouragement and feedback. If the goal of all this assessment is to compel the student towards growth in learning, how this assessment and feedback is engaged in and delivered is essential.

Traditionally, the assessment process has been directed and delivered only by the teacher. Teachers present the learning experience and content, assess progress, and solve any problems that might arise. In recent years, there has been a greater shift to a more student-centered model of assessment, causing the forms and practices of assessment to increase in variety. Students are increasingly taking more responsibility in shaping their learning through inquiry-based approaches. Pederson and Williams (2004) argued that when students are more involved in their assessment, their work is more meaningful to them. If students are asking, "What do I need to do to get an A?" their investment is not in growth but in a grade. Research studies has shown that when students are given clear criteria supported with a well-used rubric and opportunities to dialogue, students engage more deeply in their learning (Randall & Zundel, 2012).

If educators really want learning to matter, students need to be convinced that it is worth their effort to continue to move forward and act on their learning. The way that teachers assess and give feedback can impact how a student receives that feedback and how they decide to move forward. Will they try again? Will they seek to improve? Will they explore opportunities to extend their understanding and application of learning? Will they give up? Will they ignore the feedback and drop it in the recycling on the way out of the classroom, seeing it as irrelevant? Will they see it merely as affirmation of the person they have always believed themselves to be?

How assessment and feedback are given is pivotal in either spurring a student towards growth or giving the student a reason to disengage from learning. A student will arrive in a

given classroom with either a fixed or growth mindset (Barnes & Fives, 2016; Blackwell, Trzesniewski, & Dweck, 2007; Dweck, 2016). Dweck (2016) wrote about two beliefs regarding intelligence and learning. Those with a fixed mindset see their intellectual ability as stable and unchanging. Success is as an affirmation of this stable trait and failure is experienced with great frustration. Those with a growth mindset see their intellectual ability as malleable and able to grow. Success is a result of effort and practice while failure can be viewed as an opportunity to try again.

Barnes and Fives (2016) reported that during the middle years of learning, students may be particularly impacted by the context of their learning and the nurturing of mindset. These authors noted that when teachers facilitate feedback in a way that supports a growth mindset, learners are more likely to respond and act on the assessment. Teachers need to consider how they can support the development of a growth mindset when working with students who hold a fixed mindset. For those already inclined towards growth, teachers should continue to nurture this orientation towards learning through learning activities and effective assessments.

A study completed by De Kraker-Pauw, Van Wesel, Krabbendam and Van Atteveldt (2017) sought to find a correlation between teacher mindset and student mindset, anticipating that teachers with a growth mindset would value increasing student achievement over end marks. Based on survey results from both middle school aged students and their teachers, the researchers found a positive correlation between student and teacher mindsets towards learning. These researchers also explored the forms of assessment that these growth mindset-oriented teachers might use that called students to response. Their findings were uncertain and did not reveal clear practices that correlated significantly with one mindset or the other. These

researchers suggested that beliefs do not always match practice, affirming the importance of research on nurturing growth mindset in middle school students as well as in teachers.

Problem

Considering how much a growth or fixed mindset can shape a student's learning experience and development, it is imperative that teachers understand this concept and engage in pedagogy that nurtures a growth mindset. It is also important for teachers to examine their practice in order to identify choices they have made that may inhibit a growth mindset.

Research Questions

Various studies have shown that one's beliefs about intellectual ability do have an impact on our learning (Barnes & Fives, 2016; Blackwell, Trzesniewski, & Dweck, 2007; Dweck, 2016). Middle school students are in the midst of forming their beliefs and values about learning and in this formative time, teachers have significant influence. In this context, teacher beliefs about intellectual ability may also shape a student's experience of learning (Butler, 2000). The purpose of this research study was to explore how a teacher can nurture a growth mindset in students through the use of feedback and assessment, inviting them to take initiative and responsibility in their learning process. Specifically, this study sought to answer the following questions:

- Does a teacher's beliefs about the malleability of intelligence and ability impact students' beliefs and mindset?
- What kinds of feedback nurture a growth mindset in students?

Definitions

For the purpose of this study, the following definitions were used. Unless otherwise noted, the definitions are those of the author.

Assessment - a combination of tools and strategies to gauge student progress in, as, and for learning.

Entity theory – a belief that intelligence is a fixed ability (Blackwell, Trzesniewski, & Dweck, 2007).

Fixed mindset - a view towards traits or abilities that holds these as fixed and stable. Those with a fixed mindset hold an entity theory of intelligence.

Formative assessment – assessment that happens as student learns, intended to inform next steps and promote growth.

Growth mindset - a view towards traits or abilities that holds them to be malleable and capable of growth.

Incremental theory – a belief that intelligence is malleable (Blackwell, Trzesniewski, & Dweck, 2007).

Inquiry-based learning – learning activities that start with posing a question or problem that guides and sets purpose to the learning rather than simply presenting established information.

Student feedback - a form of assessment that is student directed; this can include peer or self-assessment.

Summative assessment – assessment of learning at the end of the process; the final result of the learning process.

Teacher feedback - a form of assessment that is teacher-directed and initiated in order to communicate achievement and progress.

Summary

Middle school students are at an essential formative age as they are in the early stages of forming and getting to know their own personal identity and ways of thinking about themselves

and their world (Barnes & Fives, 2016). This is an exciting time to work with students and the potential to nurture a love for learning is real.

Literature Review

Teacher and student beliefs about intellectual ability inform a student's experience of learning. "Students with a growth mindset are more interested in learning, more eager to take on challenges, and more academically successful" ("Growth mindset assessment", n.d.). In order to make learning a meaningful and lifelong experience, it is necessary to explore how to nurture a growth mindset in middle school students through the use of feedback.

Importance of Middle Years

When considering middle school students, Barnes and Fives (2016) encouraged teachers to use a variety of ongoing strategies that not only measure learning but also encourage learning. In the middle years of schooling, students are at a cognitive development stage that is reaching towards greater independence in their learning and growth. In fact, Blackwell, Trzesniewski, and Dweck (2007) as well as Romero, Master, Paunesku, Dweck and Gross (2014) described this as a time when the very nature of adolescents is in discord with the traditional structure of schooling and tends to result in disengagement from learning. Similarly, Wigfield and Eccles (2002) discussed an expectancy belief model in children. Experiences and expectations that children gain in their childhood and adolescence, in particular, are formative in developing their expectations of success. It is important that educators design learning experiences and assessments that encourage adolescent students to believe that the learning matters and that they are capable of achieving learning goals.

Blackwell, et al (2007) sought to establish the implications of changing beliefs about intelligence on classroom behavior and achievement in a junior high (grade seven) setting over a

two-year period. In the first part of their study, students filled in questionnaires that probed their beliefs about intellectual and academic ability and made comparisons with mathematical achievement in that year and the next. These researchers found that as students progressed through their middle years, the significance of their beliefs about intelligence seemed to increase in relation to their academic achievement. The adolescent years, indeed, hold profound significance. In the second part of their study, the process was replicated in another grade seven class in advisory student groupings, but with the addition of an instructional time about growth mindset to half of the group. In this study, the researchers were able to report a significant increase in a positive attitude towards learning, as reported by their teacher, when taught about growth mindset. These researchers found that when holding a growth mindset towards learning, students tend to hold stronger learning goals, to believe that effort is worth it, and to feel more empowered and ready when challenged.

Romero, et al (2014) experienced similar results with middle school students in exploring the relationship between implicit theories of intelligence and academic achievement and attitude. These authors established this connection to mindset as well as a predictor of the level of difficulty a student will seek, given the option and the degree of emotional well-being experienced by the student over time. The authors suggested that the cognitive development at this stage (gaining the ability for metacognition) may make adolescence a particularly important time to nurture a growth mindset.

Butler (2000) conducted research with grade 8 and 9 students in Jerusalem, Palestine. Students were instructed in either growth or fixed mindset, and assessed for their own implicit beliefs. They then engaged in a math activity, received feedback, and their responses were noted and observed. Students were given artificial feedback in order to create a sense of

improvement or decline after an initial performance. Butler (2000) found that when students held an implicit belief of growth mindset, they are more likely to see improvement or decline as a result of effort and practice as compared with those holding a fixed mindset, who attributed improvement or decline to innate ability. Butler (2000) reported that it is essential to the development of self-esteem and intrinsic motivation that a growth mindset is nurtured.

Responses with Growth and Fixed Mindsets

In discussing fixed and growth mindsets towards intellectual ability, Blackwell, Trzesniewski, and Dweck (2007) suggested that those with a fixed mindset may respond to a negative assessment by giving up or reducing effort, feeling that they are helpless and that effort is futile in the face of difficulty. Those with a growth mindset are more likely to respond to a negative result by increasing effort to overcome challenge, focusing on learning goals rather than performance. Students with a growth mindset are more likely to work harder, sustain effort, and try new strategies when faced with a challenge (Romero, et al, 2014). Students with a growth mindset are more likely to raise their hands, to ask questions, and to seek opportunities to learn something new, and to see effort as the way one learns. ("Growth mindset assessment").

Does a Teacher's Beliefs about the Malleability of Intelligence and Ability Impact Student Beliefs and Mindset?

Before exploring the types of feedback that teachers could be using to support the development of a growth mindset in their students, it is necessary to believe that growth in intellectual and academic abilities is possible. A teacher needs to hold a growth mindset towards learning (Blackwell, et al, 2007) in order to facilitate this in students. Butler (2000) cited research that has shown how teachers vary in their tendency to make judgements about students based on initial outcomes and how likely students are to perceive growth. Based on Butler's research, it seems likely that it matters what a teacher believes about the stability or malleability

of ability. In discussing results of her study on implicit theories of intelligence and math ability, Butler (2000), described how teachers have shown a tendency to make judgements about student ability on initial performance and have shown a hesitancy to change this judgement upon improvement or decline. Supporting teachers in developing a growth mindset is an important step in moving towards students holding a growth mindset.

In a teacher-centered learning environment, teachers hold the responsibility for monitoring and reporting progress and solving any problems in the process (Pederson & Williams, 2004). In this context, students may see their own role as unimportant and their abilities as defined by the teacher. When given more traditional forms of feedback, such as a number score, a percentage, or a letter grade, students often seek to know merely how to achieve the highest score, what counts towards a score, and seem to lack intrinsic motivation (Pederson & Williams, 2004). With these more traditional forms of feedback, students are oriented towards a grade rather than to the actual learning. Many students become disengaged from meaningful learning and some never recover from this position (Blackwell, et al, 2007).

What perhaps makes student learning more meaningful and growth-oriented, however, is when students take ownership in the assessment process (Barnes & Fives, 2016; Pederson & Williams, 2004). Students take ownership by engaging in self-reflection and evaluation as well as inquiry-learning activities such as problem- or project-based learning. The challenge may be that our schooling remains so tied to traditional forms of feedback. This may be why teachers seem reluctant in embracing strategies that are proven to be more effective in encouraging student initiative in their learning as well as in developing a growth mindset (Pederson & Williams, 2004). The result is that what is known to be true about learning is not matching the tools that teachers persist in using.

The overall context that surrounds teachers and students can set a tone for mindset as well and there are no magic fixes (Yeager & Walton, 2011). There may be systemic changes that need to happen in order to support the development of growth mindset. The Ministry of Education in British Columbia ("Student Progress Report Order," 2017) recently released an update about assessment giving schools two options in reporting progress. The two options for schools are that they can stay with the traditional report card format with percentages and letter grades, or they can maintain a regular reporting cycle through the year that does not include percentages or letter grades at all but rather proficiency standards in some form (BC's New Curriculum, n.d.). This is an opportunity for BC schools to try something different that may more meaningfully engage students in their learning and may develop a growth mindset towards intelligence and learning.

The Ministry of Education ("Your Kid's Progress," 2017) engaged 5,973 parents in giving feedback about assessment and reporting of student learning in the period from October 2016 until February 2017. Most of the respondents filled in an online survey, while 379 attended community open houses, and 63 participated in small group meetings. Some of the most significant themes that arose in these discussions were that parents felt that students needed more ongoing, timely, and meaningful feedback in order to respond and to grow in a more meaningful manner. Parents who supported maintaining letter grades suggested that they motivated students to achieve high marks and that they were easy to understand. The parents who hoped to see letter grades phased out felt that letter grades made students complacent, were often inconsistent, and undermined student self-esteem. All of the parents agreed that they desired more personalized context and clarity from the teacher. The majority of parents wanted more frequent, ongoing, informal communication about their child's progress over the school year.

Agreeing with the parents in the Ministry of Education engagement survey, Pederson and Williams (2004) reported that research has shown that when students are more involved in the learning and assessment process, they are more interested in their performance and growth. These authors suggested that traditional forms of grading have the potential to undermine student intrinsic motivation. In discussing their study results, Pederson and Williams (2004) reported that while some students said they would work harder if they knew they were being graded, almost all reported that they wanted to continue the activity because it was engaging. The grades were not the primary motivator but when students had the opportunity to be active in their learning, they had a more positive attitude towards it. The researchers suggested that while their results show that grading may have encouraged students to perform better, grades did not seem to bring about deeper learning.

What Kinds of Feedback Nurture a Growth Mindset in Students?

It is possible that the first step in developing a growth mindset in students is by simply engaging them in discussions about their thoughts and opinions about learning and schooling. In their review of literature on social-psychological interventions in education, Yeager and Walton (2011) suggested that while there are no quick solutions in this complex system of learning, educators can start out by simply telling students about growth mindset and how the brain works. This idea is supported by Blackwell, et al (2007); Farrington, Roderick, Allensworth, Nagaoka, Keyes, Johns, and Beecham (2012); as well as the new BC curriculum emphasis on self-assessment (Ministry of Education, 2017, "Your Kid's Progress"). Yeager and Walton (2011) cited a study completed by the Charles A. Dana Centre that demonstrated a significant effect of explicitly teaching incremental (growth mindset) beliefs in learning on the number of students repeating an algebra course. This study reported an impact on the percentage of high school

students repeating algebra (from 24% to 9%) after intentionally instructing the students on incremental beliefs in learning.

It may seem a small thing to teach students directly about growth mindset, "but to a student sitting at a desk in the third row worrying about whether a poor test score means she is stupid or whether others will reduce her to a negative stereotype, an experience like learning that the brain can grow and form new connections when challenged or being invited to describe personally important values, may feel quite 'large'" (Yeager & Walton, 2011, p. 283). Changes like this can accumulate increasingly positive experiences and bring about lasting impact.

In a broader sense, it is important to develop a true sense of community in the classroom so that learning happens in the context of relationship. Learning performance improves when a student can claim membership in a learning community (Farrington, Roderick, Allensworth, Nagaoka, Keyes, Johnson, & Beechum, 2012). Farrington and colleagues (2012) suggested that a growth mindset is a necessary piece of a greater context of community, a belief that effort matters, a sense that success is possible and within control, and an understanding that the learning has authentic value.

In a case study of a grade five teacher, Barnes and Fives (2016) recommended several specific types of strategies to support growth mindset in middle years students. The authors observed the teacher modelling and encouraging students to take risks and communicating clearly that mistakes or failure are an acceptable part of learning. The teacher also provided timely and meaningful formative feedback that was process, rather than content, oriented. The teacher in this study held high expectations and used frequent student and teacher conferences to communicate feedback and encourage growth. Learning within relationship was seen to be more effective than mere numbers on a page.

Randall and Zundel (2012) recommended that teachers give clear criteria for students to know where they are heading before the learning task, rather than only giving feedback at the end. These authors also supported teachers holding high expectations, giving feedback in a timely manner, encouraging students to actively respond to feedback, and focusing on the work rather than on the students themselves. When given effective feedback, students are more likely to read it meaningfully rather than ignore it. They are more likely to reflect on their work, to look to improve, and to seek greater understanding. Randall and Zundel (2012) found that students used and responded to feedback when they felt confident that it would matter in future learning experiences. The researchers suggested that more traditional feedback tends to be seen as grade justification and not for learning purposes.

Farrington et al (2012) conducted a large literature review on this topic and gleaned out strategies that support a growth mindset. Their findings support holding high expectations, giving student choice in learning, providing clear learning goals (teachers need to be transparent about criteria and evaluation), ensuring availability of support, and creating a context of trust between peers, students, and teachers. All tools of assessment and feedback need to support these conditions; they need to value persistent effort over affirmation of natural ability. Feedback should be frequent and meaningful, actively inviting students into the process. Priority in the process is on giving students frequent opportunities to improve and to try again as well as building skills of self-regulation in the process.

An essential ingredient to any strategy for feedback in student learning seems to be authenticity. When students authentically participate in assessments that have meaningful purpose and when feedback is a natural outflow of this process, a growth mindset is more likely. Yeager and Walton (2011) gave an example of students generating reasons why their

learning was relevant compared to being told why their learning was relevant. The authentic role of the students seemed to be essential to this process having a real effect.

In Regard to Giving Praise

In looking at several studies on the effect of praise on children's goals and interpretations of achievement, Mueller and Dweck (1998) found that, overall, giving praise for ability (and grades can fall in this category) had a negative effect on motivation and achievement. The authors found that when praised for ability, children sought documentation of that high ability rather than the meaningful experience of it; these students may even sacrifice opportunities to extend learning when perceiving a risk of not receiving affirmation of ability. Conversely, when given praise for ability, a child may perceive a failure as another indicator of a fixed inability. Mueller and Dweck (1998) proposed that "that praise for their intelligence, even when it follows a genuine success, teaches children that they can measure how smart they are from how well they do. Therefore, if they subsequently do poorly, children may re-measure their ability from this low performance" (p. 34). Instead of praising ability, teachers need to affirm effort, effective strategies, and persistence so that students attribute success to effort and focus on incremental progress towards learning goals rather than on final performance. These findings were affirmed by Andersen and Nielsen (2016) when exploring the impact of mindsets towards learning in parents as they communicated with their children. Praise for ability rather than effort tended to have a negative effect overall.

Rattan, Good, and Dweck (2012) hypothesized that when given comfort statements ("It's okay, not everyone is a math student!") from an entity theorist teacher, students will be less motivated to learn and hold low expectations for future achievement. These researchers believed that the learning beliefs of the teacher impacted the learning beliefs of their students. Their

research found that when a teacher held an entity theory view of learning, they were more likely to use comfort statements after a poor performance. In responding to a poor performance, implicit theories of learning held by a teacher played a role in the pedagogical choices made for students, often choosing less engaging strategies. When testing student response to comfort feedback, students tended to report lower expectations for future achievement. Rattan, Good, and Dweck (2012) found that students also interpreted that instructors were also less engaged or invested in their growth and progress.

In summary, the following guidelines should be followed in seeking a learning context that supports the development of a growth mindset:

- Teach explicitly about growth mindset
- Learn in community and collaboration
- Model and encourage taking risks in learning
- Communicate that mistakes and failure are part of the learning process
- Give timely and meaningful feedback, being transparent about the evaluation process
- Allow/expect students to actively respond to feedback and to try again
- Give clear criteria before engaging in a learning task
- Give ongoing feedback throughout the learning process
- Focus on the process rather than the students themselves
- Give choice in learning activities
- Build skills of self-monitoring and regulation
- Facilitate authentic learning experiences that give true value to the learning.
- Avoid comfort statements that attribute performance to a fixed ability

Summary

Various studies have shown that one's beliefs about intellectual ability do have an impact on learning. Teacher beliefs about intellectual ability may also shape a student's experience of learning (Butler, 2000). Because assessment is a significant part of a teacher-student relationship, the question arises of how a teacher's mindset towards learning can influence the development of the mindset of students. A teacher decides how to frame and facilitate assessments and how to communicate feedback with students. Teachers must ask if these decisions impact how a student experiences and responds to learning. They must consider how they might shape what students come to believe about learning in terms of a fixed or growth mindset.

Methods

Participants

Three different schools located in the Lower Fraser Valley in southeastern British Columbia participated in this study. Each of these schools are independent Christian schools that follow a provincially-mandated curriculum and receive government funding. Each school is made up of predominantly white, middle to upper class families and each has a small population of English Language Learners as well as a few families of visible minorities.

School A. The class from School A was led by a 26-year old female teacher with two and a half years of teaching experience. There are 26 students in this grade eight class; 13 are male and 13 are female. Four students had an individual learning plan, six students had a learning support plan and one student was an English language learner. Of this group, 10 males and 10 females participated in the study. Seven of the students with learning challenges participated.

School B. The class from School B was led by a 29-year old female teacher with six years of teaching experience. There are 21 students in this grade six class; 11 are male and 10 are female. Five students had an individual learning plan. All students in this class participated in the study.

School C class x. The class from School C, class x was led by a 44-year old male teacher with 14 years of teaching experience. There are 26 students in this grade seven class; 14 are female and 12 are male. Two students had an individual learning plan and two students had a learning support plan. Of this group, 10 males and 12 females participated in the study. All of the students with learning challenges participated.

School C class y. The class from School C, class y was led by a 32-year old male teacher with one year of teaching experience. There are 27 students in this grade seven class; 14 are male and 13 are female. Two students had an individual learning plan and three students had a learning support plan. Of this group, 13 males and 12 females participated in the study. Four of the students with learning challenges participated.

School C class z. The class from School C, class z was led by a 39-year old female teacher (the teacher of this class is the researcher of this study) with 11 years of teaching experience. There are 27 students in this grade seven class; 13 are male and 14 are female. Three students had an individual learning plan and two students had a learning support plan. Of this group, 11 males and 12 females participated in the study. Four of the students with learning challenges participated.

Research Design

The design was a mixed study that sought to determine the correlation of teacher and student mindset towards learning and growth. In the quantitative part of the study, teachers

responded to a survey to assess their current mindset towards learning. Teachers also self-reported how they most typically assessed student learning and gave students feedback. Students were asked to consider a scenario about receiving a poor mark in a course and to predict how they might respond. They also responded to a survey similar to the one teachers used to assess their mindset towards learning.

In the qualitative portion of this study, eleven students from School C were interviewed. Ten of these students were from class z and one was from class x. The students from class z were chosen at random, the one from class x was a volunteer. The interviews were semi-structured, and answers were coded for key ideas and evaluated for trends, similarities, and differences. A focus group was facilitated to debrief and further draw out ideas from students in the three classes from School C.

Materials

Three instruments were used in this study, two of which were published by Mindset Works. Mindset Works is a team of practitioners, coaches, leaders, and researchers who are working to build effective teacher and student programs that foster lifelong learning. This organization intentionally builds off the research of Dweck and Blackwell. There are no established reliability and validity scores for these surveys. These surveys were used with permission. Links to the Mindset Works surveys can be found in Appendix A for the teacher survey and in Appendix C for the student survey.

Students were first presented with a short written scenario. This scenario, found in Appendix C, was devised by Blackwell (Blackwell et al., 2007; Personal communication with Mindset Works, 2018,) and provided directly from Mindset Works. Students were asked to

imagine themselves in the scenario where they experience failure and to suggest how they might respond. Students responded to nine different statements on a Likert-type scale.

Next, the "What's My Mindset" survey (http://blog.mindsetworks.com/what-s-my-mindset) was used to assess student mindset towards learning ability. This survey uses a Likert-type scale of responses to eight statements regarding one's view of learning, intelligence, ability, and effort. After completing the survey on the Mindset Works website, participants were given immediate analysis of their mindset, along with a short description of the value of having a growth mindset towards learning. Analysis suggested a continuum of fixed, unsure, or growth mindset.

Another assessment was used to assess teacher mindset towards learning ability and compared with the class responses. The Mindset Works "What is My Classroom Mindset?" quiz (http://blog.mindsetworks.com/what-s-my-classroom-mindset) was administered to the teachers. This assessment uses a Likert-type scale of responses to twelve statements about how feedback is communicated to students. Again, having completed the online survey on the Mindset Works website, teachers were given immediate analysis and feedback. Results gave teachers a category of mindset including fixed, mixed, or growth mindset.

Procedures

To begin this study, a variety of teachers were approached and asked to participate in this study. Only teachers in local independent Christian middle schools were asked to participate. Three teachers from one school and two teachers from two different schools agreed to participate. Consent forms were sent to parents and collected to affirm permission for participation (see Appendix B). All surveys and interviews were conducted in the same two-week period in February 2018.

Teachers generally responded to their survey just before initiating the process with students. Teachers responded to the survey, copied the result onto paper, and then were asked to describe the forms assessment and feedback used in their teaching. Students were first presented with the scenario and responded on paper. They were then directed to the Mindset Works website to complete the online survey. Students copied the sentence that suggested fixed, unsure or growth mindset onto the handout. Students were also asked to read the description of mindset and to reflect in writing on what was interesting or significant to them in the reading. At times students needed clarification on some of the statements in the online survey or asked for elaboration on the description on mindset provided by Mindset Works. Student and teacher participants completed the survey online using school computers or iPads.

Eleven semi-structured interviews were conducted after the surveys were completed (see Appendix D for a complete list of questions). Interviews were conducted with students from School C due to convenience as well as having already established a comfortable relationship with these students. Interview participants were chosen at random from those that returned the signed consent forms. Seven boys and four girls were interviewed. All students were interviewed in the same week in varying locations in the school as space and schedule allowed. The interviewer asked students about their experiences of learning regarding effort and achievement. Each participant was asked the same questions but, at times, questions needed to be clarified or rephrased. Interviews were recorded on a smartphone (audio only) until transcribed, and then deleted.

Focus groups were facilitated once all the surveys and interviews were completed. The researcher facilitated the discussion while a special education assistant that is consistently part of the class recorded notes. The discussion began with a short description of growth and fixed

mindsets, followed with two general questions of how students experienced learning activities that nurtured or inhibited growth mindset (see Appendix D). At times prompting or clarifying questions were asked to follow up on or extend statements made by students. Instructions were given to each special education assistant before the discussion. The researcher and special education assistant met afterwards to debrief and to ensure that notes captured the essence and key points of the discussion.

Results

Research Question One

Does a teacher's beliefs about the malleability of intelligence and ability impact student beliefs and mindset? When considering responses from the online Mindset Works survey, results can be organized as follows. Figure 1 shows that three of the teachers were assessed to have a growth mindset towards learning while two were found to have a mixed mindset. No teachers presented with a fixed mindset.

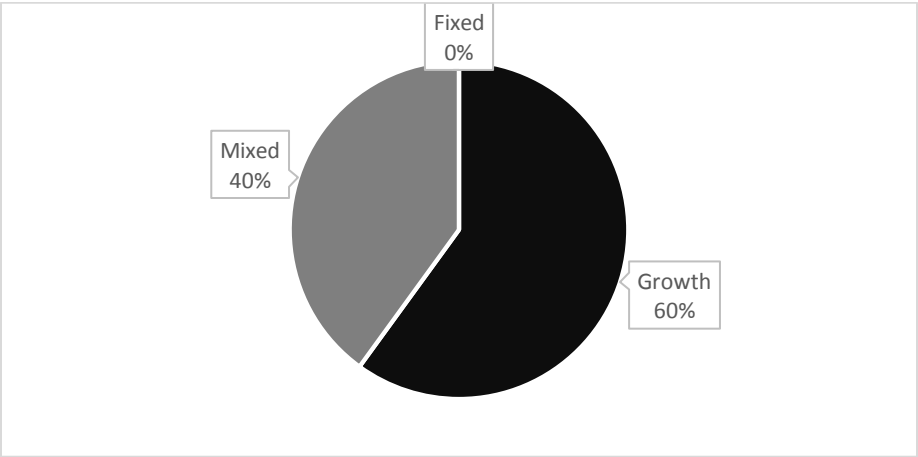

Figure 1. Distribution of growth, mixed, or fixed mindset found in teachers

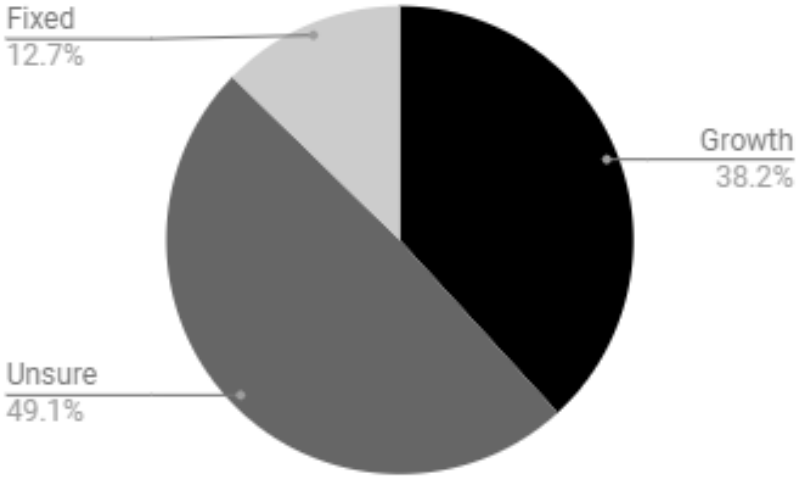

Figure 2. Distribution of growth, unsure, or fixed mindset found in students

There were a mix of student mindsets in each class with the majority of students found to be unsure about mindset. Figure 2 shows how the different student mindsets were distributed through the five classes.

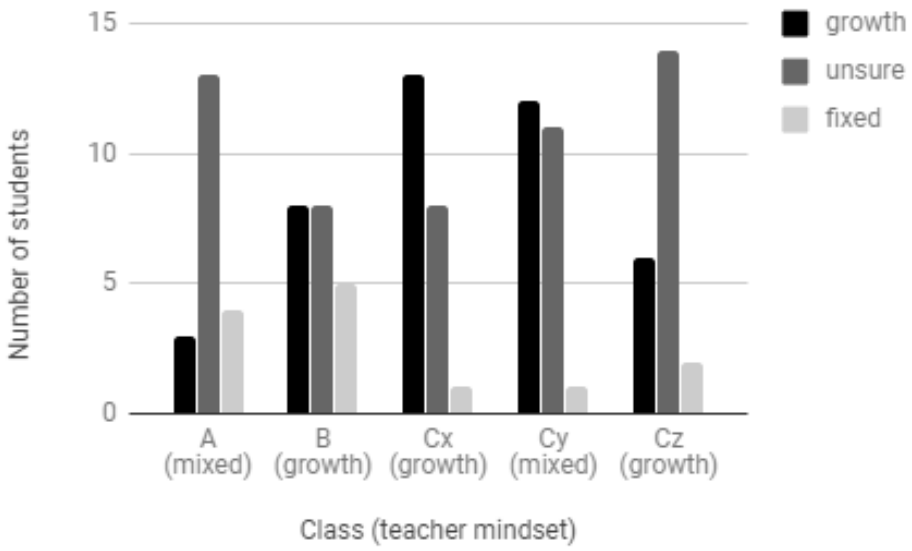

Figure 3. Teacher and student mindset towards learning (Mindset Works survey)

Figure 3 represents the distribution of student mindset according to class and teacher mindset. A chi square test was conducted to compare the observed results with the expected

values, a p-value of 0.68 was calculated. There was no statistically significant correlation between the two variables of teacher and student mindset based on this data.

When examining responses to the given scenario, participants were given a raw score between 9 (indicating a fixed mindset) and 54 (indicating a growth mindset). Overall, there appears to be no statistically significant difference between raw scores from scenario responses for mindset of students of a growth mindset teacher when compared to mindset scores of students of a mixed mindset teacher. The ANOVA test gave a p-value of 0.184 (Table 1). The mean student score for the growth mindset teachers was 42.83 and the mean student score for the mixed mindset teachers was 41.16. There were no teachers that held a fixed mindset.

Table 1

Anova: Single Factor for Students of Growth vs. Fixed Mindset Teacher

SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
44	64.000	2740.000	42.8125	44.91666667		
45	43.000	1766.000	41.06976744	41.59025471		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	78.114	1.000	78.11350793	1.792165497	0.1835538436	3.931556186
Within Groups	4576.541	105.000	43.58610188			
Total	4654.654	106.000				

When the data is focused only on the students of the strongest growth mindset teacher (Cx) and the most mixed mindset teacher (A), then the following results illustrated in Table 2 were obtained.

Table 2

Anova: Single Factor Cx and School A

SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
41	21	915	43.57142857	51.55714286		
45	19	741	39	40.77777778		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	208.4571429	1	208.4571429	4.487665911	0.04073684641	4.098171661
Within Groups	1765.142857	38	46.45112782			
Total	1973.6	39				

In this case, the ANOVA test gives a p-value of 0.0407, giving a moderately significant difference between the classes and a possible correlation between teacher mindset and student mindset. Based on these results, it is difficult to suggest that the teacher mindset has an influence on the student mindset.

Research Question Two

What kinds of feedback nurture a growth mindset in students? After completing the online survey, teachers were asked to list the ways they most typically assess student learning and communicate feedback. The teacher responses are directly quoted in Table 3.

Table 3

Self-Reported Assessment Used By Teachers:

	A (mixed)	B (growth)	Cx (growth)	Cy (mixed)	Cz (growth)
Forms of feedback used by teacher	a mix of formative/ summative. Students always have the option to re-submit work that they think they can improve on. Written feedback/rubrics	tests, quizzes, projects, drama presentations, hands on projects, artistic representations	rubric, anecdotal, numeric scores, verbal conferencing	tests, quizzes, projects, written work feedback, verbal/written feedback	rubrics, re-submissions, tests, projects, quizzes, FreshGrade reflections and comments, written and verbal anecdotal comments, observation, lots of conferencing, self-reflection on learning targets,

Teacher Cz had the most variety and detail in feedback and assessment methods though each other teacher reported similar tools and processes. Nothing stands out as unique in any class. All teachers referred to tests and quizzes (sometimes indirectly by referring to numeric scores). Two teachers mentioned giving opportunity to try again though one is a mixed mindset teacher and the other is a growth mindset teacher. Three of the five teachers referred to using rubrics. Three reported engaging in verbal interaction.

Interviews

All interviews were recorded and subsequently transcribed and coded to identify the following themes and trends.

On effort and motivation to learn. All students reported that effort is more important than getting good grades. They felt that it was important for teachers to notice your effort "so you can try again" or "so it looks better if you didn't do well" (Student 2). Only three students expressed that effort was to learn in order to grow as a person or feel good about yourself. Student 1 felt that "it feels better, like as a person. You feel like you've tried your best." Two students suggested that effort is something you do when you are struggling. The overall majority of those interviewed saw that the purpose of effort was to get good grades.

All students reported that they would try again when given the opportunity, though some felt it might depend on how big the error was, and one felt it depended on if the concept was worth learning or not. Student 5 said that when a mistake is made, "sometimes it feels like 'oh, that's so stupid.' usually it's just really embarrassed." Many of the students reported negative feelings with mistakes (stupid, embarrassed, disappointed, upset, or sad) and two students said they tend to blame mistakes on other things like busyness or other people. While this seemed consistent amongst interview participants, most students still believed that they would respond to a mistake by working harder or trying again "because then you actually know the stuff and you don't just say 'I don't know this stuff' and you just give up on it" (Student 2).

When considering why one would bother learning at all, eight of the eleven students felt that learning was a way to better oneself. Student 8 said, "I like knowing how to do things" and he liked to learn "so that I know I can actually do it." Student 6 said, "I want to get better." Half of the students were more motivated to learn when seeking to overcome something hard. Other important motivators were a positive relationship with the teacher (Student 6 said, "He said I did really well and that kept me going" and "saying they believe in your and that you can actually do it; that's good motivation"), hands-on and collaborative activities ("I really like making things

and getting creative," said Student 6), and learning that involves choice and personal interest. Student 8 reported that he is motivated "when it's something really interesting or something that I enjoy. . .like an interest . . . or like this Discovery Fair thing. You can choose whatever you do. Something you're really interested in and I think that's fun. I still haven't decided what I'm going to do but there are so many options!" At this school, these grade seven students were just about to launch into a week-long learning experience where all classes were put on hold and students were able to learn a topic of their choice and then present it in a celebration of learning evening. This has been a highly motivating learning experience. Student 11 also commented that he was motivated "when it's stuff you want to learn. Like in Discovery Fair where you can choose whatever you want." Only three students referred to marks as motivators to learn.

When further prompted to explore how students valued understanding the purpose for their learning, most students reported that they were often led to understand why they are learning something. They appreciated this and felt that this motivated them to work harder at it "because I'll need it to get a better job and better for the rest of my life" (Student 5). Students worked harder at skills that more obviously seemed to matter "like division, but if it's like 'why are we learning how to build fireplaces. . .' something that isn't a big deal in life and doesn't do much, then it's probably not worth it" (Student 11). Half of the students said that when they felt it was pointless, they gave less effort. "When we're just doing something because we're doing something; when the teacher tells you we're just going to do it and don't tell you why it is, it kind of seems pointless" (Student 1). Student 5 also felt that "it feels pointless if I haven't used that skill yet, I might not ever use that skill." Three students felt that it didn't really matter what the purpose was, they just trusted that if we're being taught it, it must matter. Student 4 felt that

"most of the time, we're learning something for a reason and I'll use it at a different time." Student 7 felt the same, saying that "even if it's something small and you don't think it's going to continue with you in your life, it might affect somehow in a small or a big way." Overall, it was very important to most students to understand and experience the significance and purpose of their learning.

To make comparisons, the interviewer asked about what kinds of learning experiences led to discouragement or disengagement. Answers varied but included busyness, missing school because of being sick, being bored, getting a bad mark, and not getting help when it was needed or having a poor relationship with the teacher. Student 8 described how disengagement in one area can impact other learning experiences. She said it's "a little bit like sometimes in music. I don't really want to learn this, and I carry that attitude along. I'm like 'kay, I already know this and . . . so I don't really care to learn' and then I carry that attitude."

On receiving teacher feedback. All students appreciated clarity and meaningful direction from teachers. They wanted feedback that they could actually do something with. "I try to, like, listen to the feedback and take every step to finish it. So, like, if they say, like, do this or that, then depending on what I should do, okay, I'll try that and see if it does help me do better" (Student 7). Most students reported that if they were given clear suggestions, they would take this and make the improvements and use it to guide future efforts. Two students mentioned that they were annoyed at receiving specific feedback that compelled them to make changes but that they always did it anyways.

When considering the use of rubrics, student saw them as helpful. Student 1 saw rubrics "like a path to go on. Like, I use it like a checkmark. Every time I do something, I check it off, so I know I got that." Student 6 commented on the use of clear descriptions in the rubric and

found that "you can't just look at the number and say, 'Oh I got a two,' but now what am I going to work at? You look at the words and say 'Oh, that's what I did, and this is what I have to do." All students reported that when given a rubric at the beginning of an assignment, they would look at it to see what they should do and then checked again before handing it in to be sure their work was appropriate.

In the classroom of the students that were interviewed, learning targets are often posted on the board or on handouts, assignments, and tests. About half of the students felt like this was a goal to work towards as described by Student 8 as "just kind of the end goal; this is where you should be at when the unit's done, so I try to get to that point." One student felt that looking at learning targets was a way to self-assess his own progress. Student 1 said, "They're helpful because they kind of categorize everything. Like on a math test, and if it's circled, it's like 'okay, I know I need to work on that.' and it's more specific of what I need to work on." Student 2 described that "if I get a mark back with the learning targets, then I will look over the learning targets, and it will let me know if I am doing good on something and the skill that we're doing. And I will work on that thing, so I will do well in the future on it." Several students felt confused by the presence of learning targets or unsure of what to do with them.

When asked about report card marks (all these students receive both a letter grade and percentage on their report cards), students were not able to clarify how these marks inform them on how to move forward. Many suggested that having a low mark meant they needed to work harder, but very few could suggest how they might do that. Two students mentioned the accompanying comments from teachers sometimes provided this information. Interestingly, one student interpreted his marks based on his relationship with his teacher. "It depends on the teacher, you might not believe them. In grade 5, the marks were sometimes not good, and I

wasn't happy. But depending on the teacher, I didn't really believe them because it was just mean, and I know that other people thought I was doing better at it" (Student 11). The clear conclusion on this theme was that students felt comfortable about marks but were unsure of how to use them in moving forward beyond feeling proud of a good mark and discouraged by a poor mark.

On strategies for "working harder". "Working hard" was a phrase repeated frequently throughout all interviews. The interviewer's overall impression was that students had little idea of what working harder meant and would just rely on the teacher to solve the problem or answer the question. One alternative many students gave was to ask a parent or friend instead of or in addition to the teacher. Three students suggested they would try to "figure it out myself" (Students 3, 8, and 11), but had no specific strategy of how they might do this. Two students thought they might search for answers online. Student 11 had one very clear strategy that helped him when he is stuck: "Just do it, don't look at the clock, it feels like it takes longer."

When asked about having the opportunity to practice, three students explained that practice is what gives you a fair chance and an opportunity to get help along the way. These students associated practice with feeling less nervous and more relaxed and, therefore, more motivated to learn. Most students were uncertain how practice played a role in learning.

On receiving praise or critical comments. All students appreciated words of praise. The example in the interview was "You're so smart!" and "You are just so good at math!". These words made them feel smarter, successful, motivated, a sense of 'I can do it!', and that someone believed in them. Words of praise felt encouraging and motivating. Student 7 felt that it added pressure and he was harder on himself as he felt that he just had to keep proving it.

When responding to more negative comments, ("You're just not smart" or "You're just not good at math"), most students suggested this would cause them to work harder and prove it wrong. Student 2 suggested that "It makes me want to study harder and get better at the stuff they say I'm not good at." Student 5 felt similarly: "It might make me a little bit sad, but I would just try harder next time." Four students admitted that "When they say I'm not smart, it makes me feel that way. Words can do a lot" (Student 6). Student 8 also felt "like I probably wouldn't try as hard because someone is saying not matter what you do, you can't do it."

Focus Groups

At the conclusion of study, focus group sessions were conducted to debrief with each of the three classes at School C (Schools A and B received video supplements to debrief the experience). Each session began with an explanation about growth and fixed mindsets towards learning and then followed up with a discussion on how growth mindset is nurtured or inhibited. The researcher facilitated the sessions while the special education assistant (SEA) assigned to the class took careful notes. Both the researcher and the SEA conferred together immediately afterwards to compare thoughts on the themes of the session.

In each of the sessions, students understood that growth mindset referred to growing in learning, expanding knowledge, having an open mind, and being willing to learn. They described growth mindset as when you "don't expect things to come naturally. You have to want it and work hard for it" and "if you're already the best at something, you won't have the motivation to try to get better."

The students described a fixed mindset as when you "lock in on an idea" or are "not willing to change your mind". A fixed mindset was understood to be "staying in your comfort zone, not branching out" and "not thinking you are smart."

When asked what kinds of learning experiences in school might nurture a fixed mindset in students, the following themes became apparent. While things like negative criticism and bad grades or even work being too easy might lead to a fixed mindset, the bigger factor was how students tended to make comparisons with others. In each of the sessions, this same idea came up and as soon as it was said, many more students nodded or added their own similar thoughts to the discussion:

- "When people say their marks to each other, you can feel you're not good enough"
- "Comparing and how we talk to each other"
- "Having a hard time with a subject and someone else say it's easy"
- "When someone says something that lets you down"
- "Sharing test scores" (referring to the practice some teachers use of having students call out their mark, so it can be documented)
- "When other people tell you that it is pointless"

Exploring this response, the researcher asked, "So it matters less what teachers do, but more what peers say to each other?" The students responded with a resounding, "Yes!" and nodding their heads emphatically. When this came up in subsequent focus groups, all agreed that peer relationships were a significant influence in how they thought about their own learning and achievement and so they felt it impacted their mindset towards learning.

In considering experiences that help students see potential for growth and develop a growth mindset, students reported activities that allowed them to learn effective strategies from others. They also referenced receiving a good grade or positive feedback (spoken or on a rubric) that felt encouraging. Several students acknowledged that making mistakes and learning how to do something the next time could point towards a growth mindset. Many students gave examples

from their experiences on athletic teams that illustrated learning from mistakes. Students also suggested that a positive relationship with the teacher and peers created a learning environment that encourages a growth mindset. A particularly insightful student suggested that a growth mindset is nurtured, "When you are given empathy instead of sympathy"; he felt that knowing that other people have been through hard things would help develop a growth mindset.

As taking the opportunity to learn from mistakes and being willing to try again is an indicator of growth mindset, participants in the focus group were asked if teachers tend to let them try again. All three groups said that this was very inconsistent. Some teachers required trying again all the time, some allowed it some of the time, and some teachers never allowed or encouraged it.

Students felt that not being allowed to try again set them up for holding a fixed mindset. In classes where trying again is not encouraged, they feel more pressured and stressed; one student said he felt "finished."

When trying again was allowed and encouraged, students felt that there was room for mistakes and opportunity to learn from them. They described this environment as "safe" and "you feel like you can actually learn" because "a mistake doesn't mean the story is over." One student observed that "The best players are the ones who make mistakes because then you practice." Another student commented that this would mean that "Sometimes you just wing it" and don't care a lot, giving less effort. While the vast majority of students disagreed with this last statement, some confessed to feeling frustrated because some people are not authentic, and they just copy off someone else and get the better mark.

Students were asked why a student would choose not to try again. In their responses to this question, most students referenced phrases that could indicate a fixed mindset:

- “They probably believe they can’t do it any better”
- “People who don’t try again feel like it doesn’t really matter”
- “If your friends don’t study - because they’re good - then you don’t study”
- “See grade, got something bad, and they don’t care”

Some students noticed that different assessment strategies might be a factor in determining a mindset. One student brought up an example of true and false questions. This student felt that there is no point in trying again in closed options like these. These questions appear easy to answer, but in the end, there is no opportunity to better yourself if an error has been made because if true is wrong, false must be the correct answer. There is no way to earn this correction and as a result, he felt that this type of activity would lead to a fixed mindset. On the other hand, when there were clear and meaningful descriptions and words on a rubric, students felt like they had a place to go and ways to improve.

Other students discussed varying reasons for not trying again such as feeling discouraged, being lazy, having a poor relationship or interaction with a teacher, or “when the teacher says, ‘A lot did good, but some did not” (having a feeling of being compared). In considering a poor mark, one student suggested that “When someone is discouraged about a mark they got on their test and a friend got better, you feel discouraged. Marks trigger the feeling that it’s all you’ll ever be.” In response, the researcher asked why students still want to see marks. Another student responded that “We want affirmation to see if we did something right or wrong.”

Overall, it was clear that students seemed to feel more influenced by what peers said, thought, and did. They could easily describe examples of this and elaborate on them. It was more difficult for students to suggest assessment strategies that might impact their mindset towards learning. When the researcher probed student thinking on specific teacher strategies,

such as rubrics, they responded very positively. When reflecting on rubrics, students reported that they preferred words (like emerging, developing, proficient, extending) over numbers on a rubric (1-4). They felt that a number or a letter tends to define you ("When I see a mark, I think that must just be who I am") while the words give direction and room to move forward.

Discussion

Overview of the Study

The purpose of this study was to explore the correlation between teacher and student mindsets towards learning. These two variables were assessed using surveys and prediction of response by students and data analysis was conducted for statistical significance. In addition, the study also sought to explore how teachers nurture a growth mindset in students through assessment and reporting feedback. Teachers were asked to report their methods of assessment and students were interviewed about their experience of learning.

Summary of Findings

Based on survey and scenario results collected in this study, there was no statistically significant relationship between teacher and student mindset. That being said, there are two interesting distinguishing features in these results.

The first feature is that the two teachers with mixed mindsets were only in their first year or two of teaching. Teacher A had two full years of teaching experience and Teacher Cy had only one year of teaching experience. The three teachers with a growth mindset had more years of teaching experience (six years, eleven years, and fourteen years). This might suggest that a teacher moves on a journey of growth in their own mindset towards learning as they gain experience and confidence in working with students. A question arises of how universities are preparing student teachers in forms of assessment and feedback that nurture a growth mindset. It

would be worth investigating how growth mindset has become part of (or not included at all in) teacher education.

The other interesting feature of these results is the distribution of mindset amongst students. A positive observation is how few students held a fixed mindset. This may suggest that parents and teachers, overall, are doing a good job of nurturing a growth mindset in their children and students. However, the majority of students (49%) are unsure about mindset towards learning. This affirms the understanding that students of this stage of development are vulnerable and uncertain as to their own identity. This is the time to introduce the idea of growth mindset and set them on a positive journey in lifelong learning. Before a fixed mindset is established, there is time to help students see the benefits of practice and growth.

Recommendations

Being middle school aged, it is not surprising that the students involved in this study were in flux as they sought to form identity in so many areas in this development stage. These students are vulnerable to developing a fixed mindset and teachers need to be deliberate in nurturing a growth mindset during this formative time. This should not be left to chance if educators care about how students experience and respond to their learning and begin to define for themselves who they are as lifelong learners. "Educators need to understand the developmental needs of young adolescents, and in particular their neurological, social, emotional, and metacognitive growth" (Armstrong, 2006, p. 113). This is an extremely vulnerable and formative time in a child's growth; this is a fantastic responsibility for teachers!

Based on the qualitative responses of students in written response, interview, and focus group discussion, it does become more evident how teachers can nurture a learning environment that invites students to develop a growth mindset towards learning. Teachers need to consider

how they form positive relationships with and among students that build trust and a sense of safety to make mistakes. Armstrong (2006) pointed to the middle school model that forms small learning communities with a homeroom teacher that acts as a mentor, guide, and counselor. Several students spoke about receiving feedback in the context of relationship helped them understand that their teacher supported and believed in them. Student 6 reported that "He said I did really well and that kept me going" and "Saying they believe in you and that you can actually do it; that's good motivation." In the focus group session, one student remarked that relationship is the reason a student would be willing to try again; it depended on the "love that was shown."

Teachers need to form safe learning spaces that build confidence and purpose in their learning. Engaging in clear and authentic purpose in learning leads students to give effort that feels worthwhile and is meaningful. Teachers need to give feedback that not only compels and encourages trying again, but also equips and gives direction to students. Schools need to consider the role of marks and how progress of learning is reported to both students and parents. Student 11 spoke about how, because of the poor relationship with his teacher, he did not believe the marks he saw on the report card, nor did he see any point in giving more effort. In focus group discussions, it was clear that students felt that feedback in words, rather than number scores, gave them places to go and numbers were an end point. They felt that "marks trigger the feeling that it's all you'll ever be."

Reflecting on the connection between new teachers and a mixed mindset towards learning, teacher education programs need to consider how they are educating new teachers in pedagogy that nurtures growth mindset. De Kraker-Pauw et al (2017) found that beliefs held by teachers do not always translate directly into teaching practices that nurture growth mindset. Pre-service teachers need to be taught how to deliberately nurture a growth mindset in students.

For future study, it would be worth exploring how a teacher develops a growth mindset as a result of experience gained in teaching. It would also be important to study the pedagogy of teachers with a strong and established growth mindset towards learning. Schmidt, Shumow & Kraker-Can (2015) observed two teachers and their grade seven science students. They found that the teacher that was more successful in promoting a growth mindset in her students had more experience than the teacher that found this more difficult.

This difference between new and experienced teachers may also be a product of being a new teacher and the insecurity often carried of seeming incompetent. Gaining experience and developing a sense of confidence in assessing student progress may nurture a teacher's development of a growth mindset.

There do seem to be strategies that promote the development of a growth mindset. Teachers need to deliberately teach mindset to students and use assessment strategies that promote a growth mindset. Schmidt et al (2015) found that it was essential for a teacher to use explicit language that promotes a growth mindset when interacting with students. The conclusion of their work was that when teachers were clearly supportive and engaged in growth mindset behaviors and language, students were far more likely to adopt these beliefs and strategies and maintain them over time. Educators must explore ways to teach growth mindset in the context of all learning. Based on what students reported during this study, the following pedagogical practices should be considered.

Authentic learning experiences. Teachers need to engage students in authentic learning experiences. When students are able to practice their learning in an authentic setting, they are able to see clear purpose. As students reported, when purpose is clear, then effort increases. Quoted by Oppewal (1997), Wolterstorff wrote, "it is nothing but a pious wish and a grossly

unwarranted hope that students trained to be passive and non-creative in school will suddenly, upon graduation, actively contribute to the formation of Christian culture" (p. 110). Students need to practice living as genuine citizens in community now so that their learning has real impact and significance. An example might be writing and sending a letter of encouragement to someone in community or a persuasive argument to a local politician rather than merely practicing writing paragraphs that stay in a binder.

Experience challenge. It is apparent that students are motivated by doing things that are challenging and that require investment and effort. Students need to experience that effort is worthwhile and leads to accomplishment and overcoming challenges. When success is achieved and celebrated easily, there is no reason for effort. Masters (2014) encouraged teachers to lead students into what Vygotsky called the 'zone of proximal development'- the place in learning where success is possible but only with guidance and support. Masters (2014) reminded teachers that when students are stretched and challenged, they learn to reach for higher goals, rather than settling for easy ones. The interviewed students that mentioned the Discovery Fair experience affirmed this position; these students will experience challenge in taking over responsibility for setting direction in their own learning - this is the part of the experience that is motivating.

Students and teachers need to build strategies for solving problems and giving effort. Students in this study were uncertain of what effort looked like, even if they were certain it mattered. They knew that they experienced challenge that required effort but had little idea of how to approach this.

Safe learning community. For students to engage in challenge, it is imperative to consider the context of the learning community. Learning in a community of positive relationships allows a student to feel safe and comfortable enough to explore challenge and make

mistakes. If teachers are truly interested in supporting growth in students, this takes time and investment in relationship (Masters, 2014). In community of positive learning relationships, a student is more likely take the opportunity to try again and learn from mistakes. Teachers need to watch for peers making comparisons with each other, knowing that this can lead to a student feeling discouraged or disengaged and to that student giving up.

Hands-on, active, and collaborative learning. Students feel more engaged in the learning process when there are hands-on, active, and collaborative learning opportunities that involve choice and self-direction. Students will remain in a fixed mindset and in flux and uncertain when they are not given the opportunity to take the driver's seat and set direction in learning. Teachers need to create learning opportunities that empower students to make choices. In a safe environment, they can experience consequences for their choices and then try again.

Grabinger, Dunlap, and Duffield (1997) recommended a problem-based learning solution to invite students to take responsibility in learning. It is their contention that these types of hands-on and collaborative learning experiences build skills necessary for 21st century learning. These types of learning experiences are characterized by student responsibility, dynamic and generative learning, authentic contexts, collaboration, and reflection. When using problem-based learning, it is the problem that sets the direction in learning rather than learning a set of skills in order to solve a pre-selected problem. This gives clear purpose in learning as well as engaging students in active participation. Further research is advised to explore the correlation of problem-based learning and the development of growth mindset.

Assessment for growth mindset. Teachers and schools need to be consistent in their approach to assessment. This includes practices such as allowing and encouraging students to

try again. O'Connor (2011) outlined key ways that schools can commit to fixing a broken assessment program. A key part of this process is to always let a student try again and resubmit coursework. He also suggested that formative assessments should not be averaged to create a final mark; these are practice opportunities and a student should not be penalized for not getting it right the first time. Students must be allowed the opportunity and time to practice and grow and then when ready, assess and report.

Teachers need to give feedback to students that is timely, clear, and meaningful. A number (such as a percentage) or a letter grade gives little information by which to move forward. A well-made rubric or conference with the student can equip the student to more effectively in move forward and make improvement. Marks may feel comfortable, but it was clear in student responses that they are not helpful or informative. Barnes and Fives (2016) found that when their teacher participant in their study gave students timely formative feedback that was anecdotal in nature, students were able to respond immediately as part of the ebb and flow of learning. These researchers also observed how their teacher participant used rubrics to eliminate the guesswork for students and to set them up for success in meeting high expectations.

Use of praise and criticism. The impact of praise in this study did not seem to represent the research done by Mueller and Dweck (1998). In this research study, students reported that praise encouraged them to move forward. They suggested that critical comments would spur them on to work harder. De Kraker-Pauw et al (2017) conducted an investigation in this area and found a negative correlation between the growth or fixed mindset of the teacher and the amount and type of feedback given in class. They found the teachers with a growth mindset actually gave significantly less feedback than the teachers with a fixed mindset. It is evident that

this is an area that needs to be explored more deeply before further conclusions and implications can be drawn.

Limitations of the Study

This small and localized study had a sample of 110 students and five teachers from three different schools. This was a very narrow and homogenous population. It is possible the scope of this study was simply not large enough to generate a significant result when comparing student and teacher mindset.

If this study were to be repeated, some changes should be considered. Because of the nature of the three schools being quite homogenous, they each have a similar culture that seeks to hire and cultivates teachers that demonstrate a growth mindset towards learning. Conducting this study again in a context that has a greater variety of teachers would perhaps give more variety on the continuum of growth to fixed mindset.

A second recommendation would be to have a tool that assesses teacher mindset and strategies at a more significant depth. The survey in this study was effective in assessing mindset, but the information gained was limited. It was difficult to know how the teacher interacted with students, conducting and communicating assessment. Even if a significant association had been found between teacher and student mindset, there would have been little understanding of the tools and strategies used by each teacher.

When engaging with students of a middle school age, it is worth noting that this development stage is such that students are uncertain about a great many things and are only just learning how to think about thinking and learning. Metacognition is only just beginning. Students at this age often struggle with self-reflection and examination. It is possible that they

were not yet able to notice and fully articulate what influences their learning. An impression from the researcher during the interviews was that students are not nearly as aware of all the deliberate choices and practices that teachers use to shape learning experiences as was perhaps hoped. It seemed that many students just see much of their learning as a series of hoops to jump though in order to achieve a grade and later, a diploma.

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Appendix A

Consent Form and Survey Document for Teachers

The purpose of this project is to make connections between the mindset towards intellectual ability in students and in teachers. This is a project being conducted by Lori Carpenter as part of her Master's Degree Action Research Project at Dordt College. You are invited to participate in this study because you are a middle school teacher.

Your participation in this study is voluntary. You may choose not to participate and if you do participate, you may withdraw at any time. If you decide not to participate or decide to withdraw, you will not be penalized in any way.

The procedure of this study requires you to participate in an online survey that will take 2-5 minutes. Your responses will be kept confidential and we will not collect any identifying information such as your name or email address. The survey questions will be about your views on learning, intellectual ability, and your experience of learning and assessment of learning.

I will do my best to keep your information confidential; all data will be held in a password protected electronic format. To help protect confidentiality, the survey will not ask for any personally identifying information. The results of this study will only be used for scholarly purposes and may be shared with Dordt College representatives.

If you have any questions, please contact me at lcarpenter@langleychristian.com. This research has been reviewed and approved by the Dordt College Institutional Review Board for research involving human subjects.

Please check each box as it applies:

- ☐ I have read the information above.
- ☐ I volunteer to participate.
- ☐ I am at least 18 years of age.
- ☐ I agree to participate in this study.

Signature of participant: _____

Thank you for participating in this study!

To help me understand the context of your classroom, please provide the following information:
What is your age? _____
What is your gender? _____
How many years have you been a teacher? _____
What grade do you currently teach? _____
How many students are in your class this year? _____
How many boys? _____ girls? _____
How many of your students participated in the student survey? boys: _____ girls: _____
How many students in your class are on: IEP _____ LSP _____ ELL _____?
How many of these students participated in the student survey? _____
What are typical methods of assessment and feedback that you use in your teaching?

_____
_____
_____
_____

Please complete the online survey found at this site: http://blog.mindsetworks.com/what-s-my-classroom-mindset

Once the survey is complete, an information page will come up with a title of "What's my classroom mindset?" There is an introductory paragraph and then a sub heading that says "assessment feedback." The line below this gives an assessment of your classroom mindset based on your responses. Please complete the sentence below according to what the results of the survey show.

Your classroom' current mindset is

_____

Thank you for participating in this study! The completed study and analysis will be made available to you when it is completed.

To guide the student participants

- *Encourage honesty. Read the statements carefully and answer as honestly as you can.*
- *Don't spend tons of time explaining the statements (they are fairly straightforward) but answer small questions as seems appropriate - this is likely a new way of answering questions for them.*
- *The link for the survey should work if typed in exactly as on the survey paper. Something that may help is to paste into a google classroom or similar resource to set up an easier connection.*
- *On the last question - if they don't understand or have nothing to say, they can leave it blank - you don't have to explain it; just say "try your best but you can leave it blank if you don't understand." Please don't leave anything else blank if possible.*

Appendix B

Student Consent Forms

Consent for student survey participants

The purpose of this project is to make connections between how students and teachers both think about learning and the ability to learn. This is a project being conducted by Lori Carpenter as part of her Master's Degree Action Research Project at Dordt College. You are invited to participate in this study because you are a middle school level student.

Your participation in this study is voluntary. You may choose not to participate and if you do participate, you may withdraw at any time. If you decide not to participate or decide to withdraw, you will not be penalized in any way.

The procedure of this study requires you to participate in an online survey that will take 2-5 minutes. Your responses will be kept confidential and we will not collect any identifying information such as your name or email address. The survey questions will be about your views on learning, intellectual ability, and your experience of learning and assessment of learning.

I will do my best to keep your information confidential; all data will be held in a password protected electronic format. To help protect confidentiality, the survey will not ask for any personally identifying information. The results of this study will only be used for scholarly purposes and may be shared with Dordt College representatives.

If you have any questions, please contact me at lcarpenter@langleychristian.com. This research has been reviewed and approved by the Dordt College Institutional Review Board for research involving human subjects.

Please select your choice below.

- ☐ I agree to participate. Choosing this option indicates that
  - You have read the information above
  - You volunteer to participate
- ☐ I decline to participate.

Student signature _____ Parent signature _____

Consent for student survey and interview participants

The purpose of this project is to make connections between how students and teachers both think about learning and ability to learn. This is a project being conducted by Lori Carpenter as part of her Master's Degree Action Research Project at Dordt College. You are invited to participate in this study because you are a middle school student.

Your participation in this study is voluntary. You may choose not to participate and if you do participate, you may withdraw at any time. If you decide not to participate or decide to withdraw, you will not be penalized in any way.

There are two parts to this study. Part 1 of this study requires you to participate in an online survey that will take 2-5 minutes. Your responses will be kept confidential and we will not collect any identifying information such as your name or email address. The survey questions will be about your views on learning, intellectual ability, and your experience of learning and assessment of learning. Part 2 of this study requires you to participate in a structured interview (structured means that I have planned the questions ahead of time) that will take about 20-30 minutes. Your responses will be kept confidential and I will not collect any identifying information such as your name or email address. The interview questions will be about your views on learning, intellectual ability, and your experience of learning and assessment of learning. The interview will be recorded so that information can be studied (I will look for common themes among responses). Once the study is completed, I will delete the recording of the interview.

I will do my best to keep your information confidential; all data will be held in a password protected electronic format. To help protect confidentiality, the interview will not require any personally identifying information. The results of this study will only be used for scholarly purposes and may be shared with Dordt College representatives.

If you have any questions, please contact me at lcarpenter@langleychristian.com. This research has been reviewed by the Dordt College Institutional Review Board for research involving human subjects.

Please select your choice below.

- ☐ I agree to participate. Choosing this option indicates that
  - You have read the information above
  - You volunteer to participate
- ☐ I decline to participate.

Student signature _____ Parent signature _____

Appendix C

Student Survey Document

Thank you for participating in this study! Your responses here will help educators understand how students experience learning and how to make that a more positive experience.

Part 1

Instructions: When you read this story, pretend that it really happened to you and try to picture how you would feel and what you would do if it really happened.

You start a new class at the beginning of the year and you really like the subject and the teacher. You think you know the subject pretty well, so you study a medium amount for the first quiz. When you take the quiz, you think you did okay, even though there were some questions you didn't know the answer for. Then the class gets their quizzes back and you find out your score: you only got a 54%, and that's an F.

What would you think was the main reason why you failed the quiz?

Rate each item on a scale from 1 (very true) to 6 (not true at all). Circle the number that seems the most true to you.

	Very true					*not true at all*
I wasn't smart enough.	1	2	3	4	5	6
The quiz was unfair, too hard for the class.	1	2	3	4	5	6
I'm just not good at this subject.	1	2	3	4	5	6
I didn't really like the subject that much.	1	2	3	4	5	6

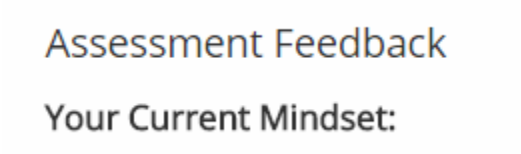
What do you think you would do next?

Rate each item on a scale from 1 (very true) to 6 (not true at all). Circle the number that seems the most true to you.

	Very true					*not true at all*
I would spend less time on this subject from now on.	1	2	3	4	5	6
I would try not to take this subject ever again.	1	2	3	4	5	6
I would spend more time studying for tests.	1	2	3	4	5	6
I would work harder in this class from now on.	1	2	3	4	5	6
I would try to cheat on the next test.	1	2	3	4	5	6

Part 2
Please go to the following link and complete the survey:
http://blog.mindsetworks.com/what-s-my-mindset

Once you've completed the survey, click the button "submit and get feedback." When the feedback screen appears, look for the subheading that says, "assessment feedback". These headings are about one third down the page and looks like this:



Please copy the first sentence after "your current mindset" on the line below:

_____

_____

Take a few minutes and read the information on this page about how we think about intelligence and learning. What seems interesting or significant to you?

_____

_____

_____

_____

_____

Appendix D

Semi Structured Student Interview Questions

Questions

- What do you think receives the most recognition from teachers? Effort (working hard)? Or Achievement (getting a good mark) or something else?
- Do you feel that effort is worth it?
- How do you typically respond and feel when something is feeling hard?
- How do you respond when you make a mistake? Do you take opportunities to try again? Why or why not?
- What is it like when you are graded on something that is brand new to you?
- What is it like when you have had opportunities to practice before being graded; does this matter?
- Does it matter to know why you are learning something?
- When you are praised for something - like "You are really good at math!" or "You are so smart!", what does that make you think about your abilities?
- What experience have you had in school that made you the most motivated to learn?
- What experience have you had in school that made you the most discouraged?

Possible cues

- How do teachers communicate feedback to you? How do you receive this feedback?

- What do you think your marks on report cards represent? What do they mean to you?
- How do you use rubrics when they are given at the beginning of an assignment?
- Do you ever think about learning targets when they're told to you? How do you use learning targets?

Appendix E

Mindset Works, Inc.
340 S. Lemon Ave. #6463
Walnut, CA 91789

Permission for use of copyright material

To whom it may concern:

We grant Lori Carpenter (Dordt College student - Sioux Centre, IA) permission to use the "Mindset Assessment" (scoring guide included) *questions* to use with student participants and "What's My Classroom Mindset" assessment to use with teacher participants as part of an action research project (January, 2018), under the following conditions:

- The "Mindset Assessment" will be distributed in **prin**t form using this Mindset Assessment and/or participants will be **routed** to this What's My Mindset Assessment page on our website.
- Participants taking What's My Classroom Mindset Assessment will be routed to this What's My Classroom Mindset Assessment page on our website.
- The *feedback* on our scoring guide is our IP and cannot be utilized on any online platform or coded onto a spreadsheet.
- Data will be collected in anonymous aggregate form and ***shared with Mindset Works,Inc.***
- All copyrights must remain intact.

We understand this is for research purposes. *Please do not further use these materials beyond the descriptions above. By using the* "What's My Mindset" and/or "What's My Classroom Mindset" *tools you are agreeing to the above terms.*

IMPORTANT: These assessments are not yet research validated. "What's My Mindset" is based on more extensive measures and is intended as a reflection and discussion tool rather than as an assessment to use with others (more info below) and What's My Classroom MIndset" is not based on existing public research measures.

Data being collected should be done in anonymous aggregate form. For example, users can see their own individual scores, and someone in a leadership position could see *anonymous* results of the *whole group* (if you have a way of facilitating that) but a leader should not be able to see the individual scores of teachers/students.

Validity/reliability information:

The short survey "Mindset Assessment" has not been used in rigorous research by itself. Rather, it contains a sampling of questions from several research-validated scales measuring mindsets about intelligence, learning goals, and beliefs about effort. These scales are too long and redundant for a quick online survey. See full scales here.

Scoring/interpretation information:

If the goal is to examine program impact in a research study, we recommend some or all of the measures Here. These were used in other research studies and have demonstrated internal reliability and predictive value with respect to one another and achievement outcomes. (E.g., see here.)

If the training is focused on mindset, be sure to include the theories of intelligence scale as a first priority. Other scales could also be incorporated based on the outcomes of most interest. See scales Here

In the case you plan to measure impact on teachers directly, rather than on students, part 1 Here may be a better option. (Part 2 addresses classroom goal structures, and was developed by different researchers.)"

Date: 12/8/17 Approved By: Elisha Perez Signed: 

Support and Operations Team

If you have any questions, please email us at support@mindsetworks.com or call us at +1-888-344-6463.